UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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May 13, 2015

James Cashwell
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312

Subject: Conditional Approval
Revised OU3 Data Gap Analysis and Additional Field Studies Work Plan
Olin Chemical Superfund Site, Wilmington, Massachusetts

Dear Mr. Cashwell:

In accordance with Paragraph 40 of the Administrative Settlement Agreement and Order on Consent ("AOC"), Region I of the United States Environmental Protection Agency ("EPA") has completed a review of the revised OU3 Data Gap Analysis and Additional Field Studies Work Plan ("Work Plan") prepared by AMEC and dated December 16, 2014.

AMEC originally submitted an OU3 Data Gap Analysis and Additional Field Studies Work Plan dated September 5, 2014. Upon review, it was the opinion of EPA and the stakeholders that the analysis of data gaps in the Work Plan lacked the required rigor and depth for decision making, and did not provide sufficient information to determine if the RI objectives had been met. On September 30, EPA provided Olin with a draft "working list" of information that, in EPA's opinion, was missing from the OU3 data gaps analysis. Discussions followed and on November 13, 2014, EPA submitted a formal comment letter which requested that the Work Plan be resubmitted.

Pursuant to Section 1.III.D of the Remedial Investigation/Feasibility Study Statement of Work ("RI/FS SOW"), EPA solicited comments from external stakeholders. EPA has consolidated certain written comments received within the context of this letter. Original comment letters received by EPA are enclosed.

Conditions of this approval follow below. Comments are organized as follows; (1) Data Gap Comments, (2) Nature and Extent General Comments, and (3) Nature and Extent Specific Comments. The Data Gap comments require additional field work and should be addressed first now that the field season is underway. The Nature and Extent comments have been limited by EPA to issues which, in EPA's opinion, are required to make informed decisions regarding data gaps. Comments which are more consistent with the complete Nature and

Extent evaluation for groundwater have been deferred in anticipation of the receipt of a thorough evaluation in the pending OU3 Remedial Investigation Report.

Conditions

1. Olin shall submit a written response to the Data Gap comments by May 29th. Written responses to the Nature and Extent comments and Condition No.2, and the revised Final Work Plan are due by June 12th.

2. EPA's November 13, 2014 comment letter identified the lack of representative data from the former municipal and Samina operating wells as a data gap (Comment No. 4). EPA strongly believes that recent data from these wells is necessary to assess existing conditions and determine the need and efficacy for remediation. Note that remedial alternatives developed in the pending feasibility study will be required to satisfy the threshold criteria: (1) overall protection of human health and the environment and (2) compliance with applicable or relevant and appropriate requirements (ARARs); which cannot be assessed without representative data. While these wells are not currently in use, representative data is also necessary to determine the need to establish administrative restrictions (commonly referred to as institutional controls) to prevent unsafe use of these wells if existing conditions do not allow for unrestricted use. Representative data would also further the understanding of nature and extent of contamination in these areas and specific chemical changes in these wells since the cessation of pumping more than a decade ago. Olin's response on p.3-3 of the Work Plan indicates that a Technical Memorandum would be prepared to support Olin's rationale for why this data is not necessary. EPA requests that this memorandum be submitted in response to this comment for further consideration by EPA and the stakeholders. This technical memorandum should also include any information in Olin's files regarding the design and configuration of these wells.

3. EPA reserves the right to identify additional gaps in data pending the review of additional groundwater data and complete responses to the comments in this letter.

Data Gaps

1. Additional Well Cluster. EPA's November 13, 2014 comment letter identified the area generally North of Eames Street as a potential data gap for groundwater (Comment No. 3). Olin's response on p.3-3 of the Work Plan indicates that Olin is considering this comment. More recent discussions indicate that Olin is willing to install a well in this location. EPA requests that Olin propose a location for at least one downgradient well cluster (shallow, deep overburden and shallow bedrock), based on the known geo-hydro conditions in that area to address this gap. A sample should be collected from each well screen and analyzed for the full analytical list, including specialty compounds. Installation, drilling and analytical methods should be consistent with the existing work plan. EPA also requests that the Olin-proposed well cluster downgradient of GW-80 be analyzed for the full analytical list, including specialty compounds.

2. Synoptic Water Levels. Given the importance of understanding the hydraulic system with regard to the groundwater divide and interaction with regional surface water bodies, and the anticipated development of remedial alternatives for groundwater, EPA requests that a minimum of 2 additional synoptic water level rounds separated by seasonality be performed.

3. GW-40S. Opex was detected at a relatively high concentration in SL-2. EPA requests that nearby well GW-40S be sampled for Opex to determine the downgradient extent of the detection at SL-2.

4. GW-70D. Opex was detected at a relatively high concentration in MP-4 and GW-83S/D. EPA requests that nearby well GW-70D be sampled for OPEX to determine if it is migrating with DAPL/diffuse groundwater.

5. GW-57D. GW-57D should be sampled for hydrazine, given that this compound was detected in both samples in GW-44D and one sample in MP-3 (both are upgradient).

6. GW-75D. EPA agrees that the current dataset for this well is sufficient and does not constitute a data gap. This well should be retained as a likely sentinel monitoring location. Note that the reference to Table 3-1 is incorrect. The correct reference is Table 3-2.

7. GW-80BR. EPA recommends that a full suite of geophysical logs be performed in GW-80BR prior to the installation of the new downgradient well cluster. Minimal bedrock information exists in this portion of the study area and logging GW-80BR should provide useful information regarding bedrock lithology and can be used to help assess the appropriate depth for the new bedrock screen.

8. GW-103BR. EPA recommends that a full suite of geophysical logs be performed in GW-103BR (to the extent it is physically accessible). This well is located on the western edge of MMB and should provide useful information regarding bedrock lithology and NDMA migration, which has been detected in downgradient private rock wells. Also, NDMA was detected at an elevated concentration in GW-103BR.

9. GW-85, GW-86D, GW-59D. MMB wetland monitoring wells GW-85, GW-86D, and GW-59D, had elevated concentrations of some Site-related compounds ten years ago. It does not appear that a full analytical suite has ever been performed. Given the importance of the MMB area to the overall understanding of contaminant flow, EPA requests a current sampling round for the full analytical suite of chemicals (including specialty compounds) in these wells.

10. Geophysical Logging. EPA requests that a full suite of geophysical logs be performed on the new bedrock wells to be installed to the southeast (as proposed by Olin) and to the north (as proposed by EPA).

11. Specific Conductivity. To the extent that specific conductivity has not been measured in existing bedrock wells, such measurements should be collected from bedrock wells GW-62BR, GW-62BRD, GW-406BRS, GW-406BRD, GW-202BRS, GW-202BRD, and BR-1 to determine the presence of DAPL or diffuse material. Elevated concentrations of NDMA have been detected in these wells.

Nature and Extent General Comments

1. Nature and Extent in Bedrock. This issue generated numerous comments and concerns with respect to nature and extent. Low concentrations of NDMA and other Site-related compounds have been detected in several private rock supply wells, typically at depths of 300 feet or more below ground surface. NDMA was also detected in several bedrock monitoring wells located throughout the study area, including MMB. Concentrations of NDMA in some bedrock wells are elevated (i.e., GW-62BR at 16,000 ng/l) consistent with NDMA concentrations typically observed in known DAPL pools, yet not all of the bedrock wells where NDMA was detected at elevated concentrations are located consistent with the known DAPL pool areas. This suggests that DAPL has seeped into bedrock fractures, not only beneath the DAPL pools, but also along DAPL migration pathways. The Conceptual Site Model (Figure 2.1-9) completely ignores the transport of particulate or dissolve-phased compounds into bedrock fractures. For example, it seems plausible or even likely that some DAPL has seeped into larger fractures over the past several decades. Diffusion into saturated fractures seems likely. Absorption into the rock matrix also seems possible. In order to fully understand the nature and extent of contamination for OU3, the analysis of data gaps should include an evaluation of the relationship between deep overburden and shallow bedrock groundwater, including DAPL and diffuse layers, and discuss transport mechanisms. To be clear, EPA does not believe it is necessary or prudent to map relatively low concentration compounds deep into bedrock fractures. However, EPA believes it is necessary to understand the physical and chemical nature of Site-related compounds in the shallow bedrock environment and the processes which control migration into and perhaps out of shallow bedrock. Significant and meaningful analytical and geophysical information exists, and should be presented to complete the conceptual site model for groundwater in bedrock. Additionally, to the extent that monitoring well BR-1 still exists within the containment area, EPA requests that it be sampled for NDMA and other contaminants of concern in groundwater. Note that Figure 2.3-2 shows a May 1990 sample result for NDMA in BR-1 as 0.001 ng/l, however the scale of the circle indicates a much higher concentration. Either the circle is scaled incorrectly or the numeric value shown is in mg/l. Please verify and correct.

2. Concentration Contour Maps. The Work Plan does not include any concentration contour maps (aka, isocontour maps or plume maps). Instead, a series of figures are provided in Appendix B which display concentration results for certain Site-related compounds as scaled-circles or squares. While EPA agreed to this approach for this Work Plan, the use of plume maps is considered by many to be the most effective method to portray concentration results and is the standard convention in Region 1 RI reports. EPA requests that such figures be provided in the pending OU3 RI report.

3. OU3 Study Area. In the AOC, the definition of "Site" includes contaminated groundwater that extends from the Olin Property to other areas. However, the only figure that displays the entire Site study area is Figure 2.3-2, and even that figure lacks detail in the area west of Maple Meadow Brook. Site-related compounds have been found in private wells located west of Maple Meadow Brook. OU3 figures, including those which display chemical data and hydro-geologic information should display the entire Site study area as defined by the extent of contamination. Please provide complete figures in the pending RI Report.

4. Elevated Concentrations in DAPL. The Work Plan does not explain the nature of the physical and chemical conditions which support the elevated concentrations of NDMA and other Site-related compounds detected in DAPL (which are not 'components' of DAPL). Are the concentrations homogeneous or do concentrations increase with depth? Is the relationship density-driven, dependent on pH, both, or other physical conditions/parameters? This relationship should be explained and included in the conceptual Site model.

5. Calcium Sulfate Landfill. Section 2.1.2.5 provides a general description of the landfill monitoring program, and results. However, as identified in EPA's November 13, 2014 comment letter (Missing Information Comment No. 1.b), EPA considers the landfill to be a potential ongoing source to area/local groundwater and the Work Plan should provide a detailed discussion of the nature and extent of Site-related compounds deducted in proximity wells, including trends, and present this data in tabular and perhaps graphical form. The Work Plan should also discuss any potential impacts to area surface water bodies including the South Ditch, East Ditch and Landfill Brook. In the context of data-gaps analysis, this information is important to understanding if the existing monitoring well network is sufficient to assess the Calcium Sulfate Landfill as an ongoing source.

6. Nature and Extent of DAPL in MMB. The dimensions of the small DAPL pool shown on the figure within the MMB wetland are unknown. This pool is currently defined as a small circle at the GW-83 cluster. Given that the bedrock topographic low in this area appears to extend to the northwest (southwest of MP-5 and east of the GW-88 cluster), what evidence is there that DAPL would not extend throughout this bedrock low? Olin/AMEC may elect to investigate bedrock depths and/or add additional well control to determine this. Although Olin/AMEC have defined this DAPL pool as a relatively small area, it appears to be a significant source of contamination to the MMBW and downgradient residential wells, as shown by the diffuse layer delineation (Figure 2.1-8). EPA and the stakeholders remain concerned that this DAPL pool (around 83D) is likely much larger than currently delineated or there are other DAPL sources in the MMB wetland given the large area of diffuse groundwater in this area.

7. Groundwater Divide. The Conceptual Site Model (Figure 2.1-9) portrays existing conditions only and does not take into account the transport of Site-related compounds during the pumping of the five municipal wells. These wells were consistently pumped at an estimated rate of 2.1 million gallons per day during the complete operational period

of the former Olin facility, and was likely significant enough to induce the migration of Site-related compounds across the otherwise naturally-occurring groundwater divide. This information is not only important to understanding the nature and extent of contamination, but may also be important to assessing anticipated remedial alternatives in the FS. Consequently, EPA does not currently concur with the depiction of the GW-1 area as shown in an Appendix B figure. Please modify the existing, or submit a separate Conceptual Site Model which demonstrates likely migration pathways during the active pumping period (pre-2003).

8. Synoptic Water Levels. Two synoptic water level rounds were completed in May and October 2011. Actual data is not provided, however water level elevation contours for deep overburden and bedrock conditions are shown in Figures 2.1-1 to 2.1-4; and for shallow groundwater in Figures 3.3-2 and 3.3-3. It appears the contours on these figures were not developed using all the available monitoring wells (Some wells are missing. For example, the GW-400 and 404 series wells to the north)? Surface water elevations should be used to the extent available to further the shallow contours. Contours should be shown or estimated to the north of Eames Street, and to the south and east of East Ditch. Also, groundwater elevations within the containment area should be shown. Please update these figures accordingly.

Nature and Extent Specific Comments

1. Vapor Intrusion. P. 2-17. The last paragraph in the VOC section states that, 'the vapor intrusion pathway (with the possible exception of TMPs) is not a concern based on a comparison of maximum shallow groundwater VOC concentrations to values obtained from EPA's VI screening level calculator.' The Work Plan should provide the screening results in tabular form, and expand on the discussion of TMPs with regard to VI (i.e, Is this concern limited to the Plant B area?).

2. Table 2.1-2. According to the summary data in this table, chromium was detected at a maximum concentration of 1,800 mg/l, which is well above the federal MCL of 0.1 mg/l, and should be shaded.

3. Figure 2.1-5. What is the source for the bedrock contours provided on this figure?

4. Figure 2.1-7. Please label the DAPL pools shown on this figure and superimpose the monitoring well locations to provide context.

5. Figure 2.3-1. Please include monitoring wells SL-2 and SL-3 on this figure.

6. Figure 2.3-2. The 'extent of impacts in bedrock groundwater' as shown in this figure should be expanded to include private wells where NDMA has been detected.

7. Figures 6.2-26 and 6.2-31 (NDMA, Sulfate & Ammonia Cross Sections). It appears that data from wells GW-85M, 85D, 86D and Chestnut #1 were not used in the development of the concentration profiles A-A' and B-B'. Although data from these wells is older (est.

2004), it is considered to be representative and is expected to be used in the pending OU3 remedial investigation report. A handwritten mark-up of the 2 NDMA figures using this data was provided by WERC (See March 17, 2015 memo attached). Please revise these figures to include these results. For the RI Report, EPA requests that similar cross-sections be provided for other contaminants of concern.

8. Appendix B, GW-1 Figure. EPA does not agree with the GW-1 delineation shown on this figure. While this Figure appears to depict GW-1 based on recent water level studies, the hydraulic conditions which were present during active pumping of the 5 municipal wells (pre-2003) have not been presented. Site-related compounds were present in 4 of the 5 municipal wells in 2003, and earlier samples. Site-related compounds were also detected in several private drinking water wells previously located on Main Street (which were subsequently subsequently abandoned and homes connected to the public drinking water system). All of these wells are shown to be within the GW-1 boundary as depicted on this Figure. The primary known source areas (i.e., the former lagoons and Lake Poly) were all located outside of the GW-1 boundary as depicted in this Figure. The transport mechanisms for these compounds from the former facility to the municipal wells has not been discussed. Absent that discussion, it seems plausible that the primary known source areas at the former facility were within the zone of contribution to the municipal and former private wells. By definition, this means that the primary former source areas on the property are within the GW-1 boundary and should be depicted as such. EPA expects the GW-1 delineation issue to be resolved for the OU3 RI Report. For now, EPA requests a written response to this comment and that this Figure (and the Section 2.3 reference to this Figure) be removed from the final Work Plan.

Please call me if you have any questions. Please provide EPA with a minimum of 3 days notice prior to performing any OU3 field work.

Sincerely,

James M. DiLorenzo
Remedial Project Manager
USEPA Region 1 - New England

Attachments: Nobis Comment Letter
GeoInsight Comment Letter
WERC Comment Letter

Cc: Heather Ford, Nobis
Joe Coyne, MassDEP
Jeff Hull, Town of Wilmington
Michael Webster, GeoInsight
Martha Stevenson, WERC